National Firefighter Registry - Project Deployment

Term: Fall 2020
Team 55
Project #55

Team Details

Team Members

- Eric Mammoser – QA
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Mentors

- Jill Raudabaugh – CDC
- Breanna Newton – CDC
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The National Firefighter Registry (NFR) project is a CDC-sponsored project based off of the Firefighter Cancer Registry Act of 2018. The application accepts input file(s) in JSON, XML, or NDJSON format containing a FHIR Patient resource, FHIR Observation resource, or a FHIR Bundle resource (containing either patients or observations). These input files are processed, posted to a public FHIR server for validation, and then extracted and inserted into a MS SQL database which can be accessed via a Tableau frontend. The primary purpose is to track firefighters who have enrolled in the NFR program to conduct research on cancer amongst firefighters.

Deployment Details

This application is delivered for usage within a Docker container, and is not hosted elsewhere. This was discussed and aligned with our CDC mentors. The application and the SQL database both run within the container, along with the input files to be consumed by the application. If Tableau is to be used as a frontend to view data, that needs to be installed and launched outside of the container.

In order to deploy and run the script, launch a terminal within the root of the repository and then:

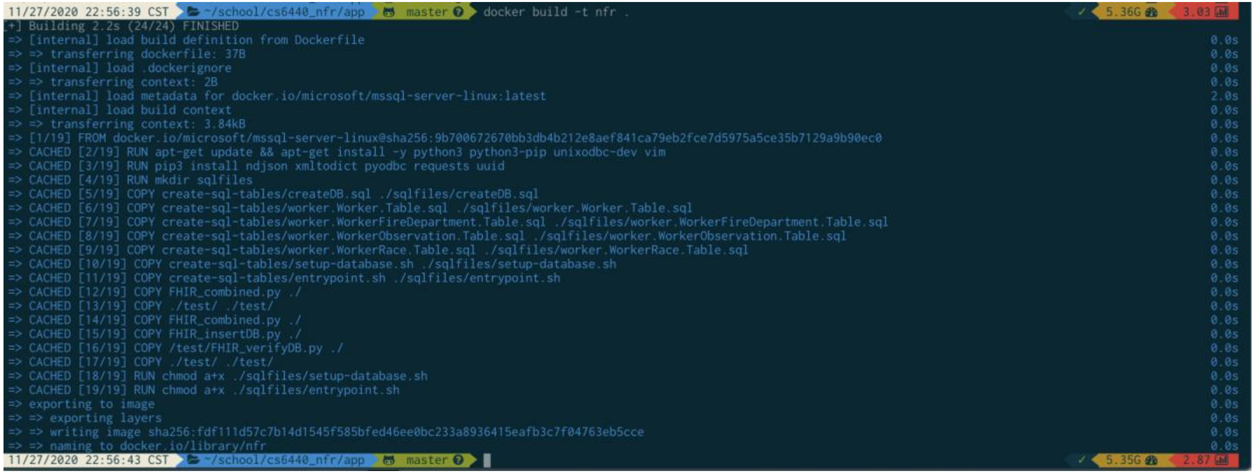
1) Change directory to app
   ```
   cd app
   ```
2) Build the docker container
   ```
   docker build -t nfr .
   ```
3) Run the docker container (this launches an interactive bash terminal)
   ```
   docker run -p 1433:1433 -it nfr /bin/bash
   ```
4) Start SQL server and build tables in background
   ```
   ./sqlfiles/entrypoint.sh &
   ```

Github Repository

Link: https://github.gatech.edu/gt-cs6440-hit-fall2020/National-Firefighter-Registry
Branch: master
Final Commit ID: `117918a4068174352adaab802baad97d16a94e30`

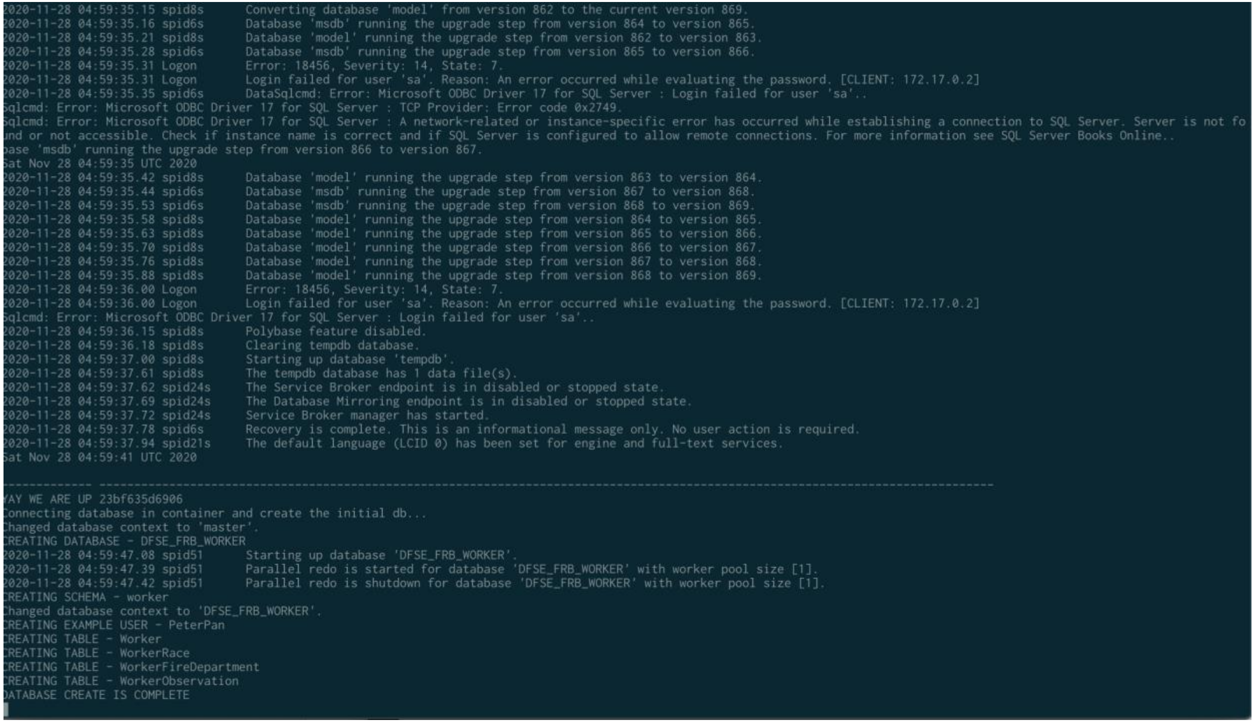
Deployed Application

Docker build log:



```
11/27/2020 22:56:39 CST  ~/school/cs6440_nfr/app  master ?  docker build -t nfr .                    ✓  5.36G  3.03
[+] Building 2.2s (24/24) FINISHED
=> [internal] load build definition from Dockerfile                                                                    0.0s
=> => transferring dockerfile: 37B                                                                                     0.0s
=> [internal] load .dockerignore                                                                                       0.0s
=> => transferring context: 2B                                                                                         0.0s
=> [internal] load metadata for docker.io/microsoft/mssql-server-linux:latest                                          2.0s
=> [internal] load build context                                                                                       0.0s
=> => transferring context: 3.84kB                                                                                     0.0s
=> [1/19] FROM docker.io/microsoft/mssql-server-linux@sha256:9b700672670bb3db4b212e8aef841ca79eb2fce7d5975a5ce35b7129a9b90ec0  0.0s
=> CACHED [2/19] RUN apt-get update && apt-get install -y python3 python3-pip unixodbc-dev vim                        0.0s
=> CACHED [3/19] RUN pip3 install ndjson xmltodict pyodbc requests uuid                                                0.0s
=> CACHED [4/19] RUN mkdir sqlfiles                                                                                    0.0s
=> CACHED [5/19] COPY create-sql-tables/createDB.sql ./sqlfiles/createDB.sql                                           0.0s
=> CACHED [6/19] COPY create-sql-tables/worker.Worker.Table.sql ./sqlfiles/worker.Worker.Table.sql                     0.0s
=> CACHED [7/19] COPY create-sql-tables/worker.WorkerFireDepartment.Table.sql ./sqlfiles/worker.WorkerFireDepartment.Table.sql  0.0s
=> CACHED [8/19] COPY create-sql-tables/worker.WorkerObservation.Table.sql ./sqlfiles/worker.WorkerObservation.Table.sql  0.0s
=> CACHED [9/19] COPY create-sql-tables/worker.WorkerRace.Table.sql ./sqlfiles/worker.WorkerRace.Table.sql             0.0s
=> CACHED [10/19] COPY create-sql-tables/setup-database.sh ./sqlfiles/setup-database.sh                                0.0s
=> CACHED [11/19] COPY create-sql-tables/entrypoint.sh ./sqlfiles/entrypoint.sh                                        0.0s
=> CACHED [12/19] COPY FHIR_combined.py ./                                                                             0.0s
=> CACHED [13/19] COPY ./test/ ./test/                                                                                 0.0s
=> CACHED [14/19] COPY FHIR_combined.py ./                                                                             0.0s
=> CACHED [15/19] COPY FHIR_insertDB.py ./                                                                             0.0s
=> CACHED [16/19] COPY /test/FHIR_verifyDB.py ./                                                                       0.0s
=> CACHED [17/19] COPY ./test/ ./test/                                                                                 0.0s
=> CACHED [18/19] RUN chmod a+x ./sqlfiles/setup-database.sh                                                           0.0s
=> CACHED [19/19] RUN chmod a+x ./sqlfiles/entrypoint.sh                                                               0.0s
=> exporting to image                                                                                                  0.0s
=> => exporting layers                                                                                                 0.0s
=> => writing image sha256:fdf111d57c7b14d1545f585bfed46ee0bc233a8936415eafb3c7f04763eb5cce                            0.0s
=> => naming to docker.io/library/nfr                                                                                  0.0s
11/27/2020 22:56:43 CST  ~/school/cs6440_nfr/app  master ?                                           ✓  5.35G  2.87
```

Docker run log (note: truncated to the end as this is quite long; note: errors are expected as the sqlserver is launched in background mode and then the entrypoint script tries to connect to it in a loop until successful):



```
2020-11-28 04:59:35.15 spid8s      Converting database 'model' from version 862 to the current version 869.
2020-11-28 04:59:35.16 spid6s      Database 'msdb' running the upgrade step from version 864 to version 865.
2020-11-28 04:59:35.21 spid8s      Database 'model' running the upgrade step from version 862 to version 863.
2020-11-28 04:59:35.28 spid6s      Database 'msdb' running the upgrade step from version 865 to version 866.
2020-11-28 04:59:35.31 Logon       Error: 18456, Severity: 14, State: 7.
2020-11-28 04:59:35.31 Logon       Login failed for user 'sa'. Reason: An error occurred while evaluating the password. [CLIENT: 172.17.0.2]
2020-11-28 04:59:35.35 spid6s      DataSqlcmd: Error: Microsoft ODBC Driver 17 for SQL Server : Login failed for user 'sa'..
Sqlcmd: Error: Microsoft ODBC Driver 17 for SQL Server : TCP Provider: Error code 0x2749.
Sqlcmd: Error: Microsoft ODBC Driver 17 for SQL Server : A network-related or instance-specific error has occurred while establishing a connection to SQL Server. Server is not fo
und or not accessible. Check if instance name is correct and if SQL Server is configured to allow remote connections. For more information see SQL Server Books Online..
base 'msdb' running the upgrade step from version 866 to version 867.
Sat Nov 28 04:59:35 UTC 2020
2020-11-28 04:59:35.42 spid8s      Database 'model' running the upgrade step from version 863 to version 864.
2020-11-28 04:59:35.44 spid6s      Database 'msdb' running the upgrade step from version 867 to version 868.
2020-11-28 04:59:35.53 spid6s      Database 'msdb' running the upgrade step from version 868 to version 869.
2020-11-28 04:59:35.58 spid8s      Database 'model' running the upgrade step from version 864 to version 865.
2020-11-28 04:59:35.63 spid8s      Database 'model' running the upgrade step from version 865 to version 866.
2020-11-28 04:59:35.70 spid8s      Database 'model' running the upgrade step from version 866 to version 867.
2020-11-28 04:59:35.76 spid8s      Database 'model' running the upgrade step from version 867 to version 868.
2020-11-28 04:59:35.88 spid8s      Database 'model' running the upgrade step from version 868 to version 869.
2020-11-28 04:59:36.00 Logon       Error: 18456, Severity: 14, State: 7.
2020-11-28 04:59:36.00 Logon       Login failed for user 'sa'. Reason: An error occurred while evaluating the password. [CLIENT: 172.17.0.2]
Sqlcmd: Error: Microsoft ODBC Driver 17 for SQL Server : Login failed for user 'sa'..
2020-11-28 04:59:36.15 spid8s      Polybase feature disabled.
2020-11-28 04:59:36.18 spid8s      Clearing tempdb database.
2020-11-28 04:59:37.00 spid8s      Starting up database 'tempdb'.
2020-11-28 04:59:37.61 spid8s      The tempdb database has 1 data file(s).
2020-11-28 04:59:37.62 spid24s     The Service Broker endpoint is in disabled or stopped state.
2020-11-28 04:59:37.69 spid24s     The Database Mirroring endpoint is in disabled or stopped state.
2020-11-28 04:59:37.72 spid24s     Service Broker manager has started.
2020-11-28 04:59:37.78 spid6s      Recovery is complete. This is an informational message only. No user action is required.
2020-11-28 04:59:37.94 spid21s     The default language (LCID 0) has been set for engine and full-text services.
Sat Nov 28 04:59:41 UTC 2020

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YAY WE ARE UP 23bf635d6906
Connecting database in container and create the initial db...
Changed database context to 'master'.
CREATING DATABASE - DFSE_FRB_WORKER
2020-11-28 04:59:47.08 spid51      Starting up database 'DFSE_FRB_WORKER'.
2020-11-28 04:59:47.39 spid51      Parallel redo is started for database 'DFSE_FRB_WORKER' with worker pool size [1].
2020-11-28 04:59:47.42 spid51      Parallel redo is shutdown for database 'DFSE_FRB_WORKER' with worker pool size [1].
CREATING SCHEMA - worker
Changed database context to 'DFSE_FRB_WORKER'.
CREATING EXAMPLE USER - PeterPan
CREATING TABLE - Worker
CREATING TABLE - WorkerRace
CREATING TABLE - WorkerFireDepartment
CREATING TABLE - WorkerObservation
DATABASE CREATE IS COMPLETE
```
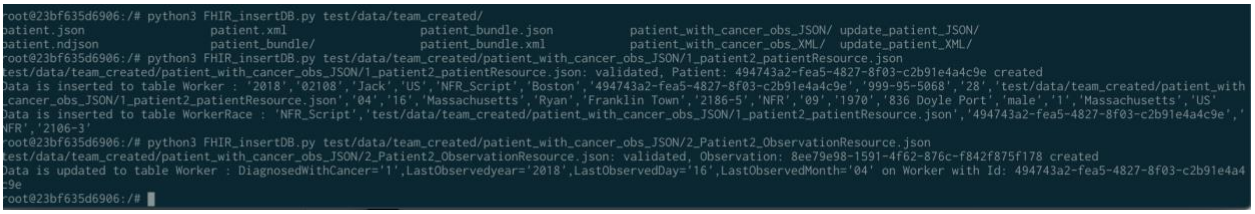
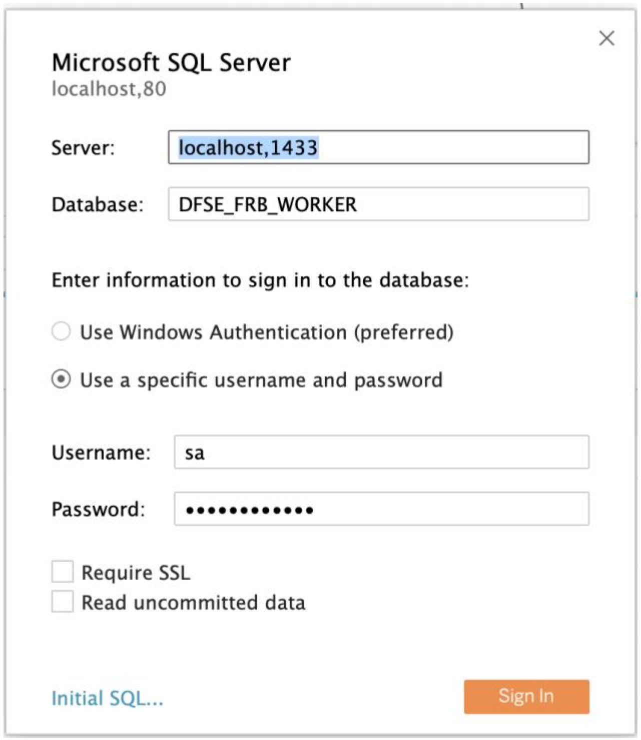

Application Screenshot (Running):



```
oot@23bf635d6906:/# python3 FHIR_insertDB.py test/data/team_created/
atient.json                  patient.xml                   patient_bundle.json           patient_with_cancer_obs_JSON/ update_patient_JSON/
atient.ndjson                patient_bundle/               patient_bundle.xml            patient_with_cancer_obs_XML/  update_patient_XML/
oot@23bf635d6906:/# python3 FHIR_insertDB.py test/data/team_created/patient_with_cancer_obs_JSON/1_patient2_patientResource.json
est/data/team_created/patient_with_cancer_obs_JSON/1_patient2_patientResource.json: validated, Patient: 494743a2-fea5-4827-8f03-c2b91e4a4c9e created
ata is inserted to table Worker : '2018','02108','Jack','US','NFR_Script','Boston','494743a2-fea5-4827-8f03-c2b91e4a4c9e','999-95-5068','28','test/data/team_created/patient_with
_cancer_obs_JSON/1_patient2_patientResource.json','04','16','Massachusetts','Ryan','Franklin Town','2186-5','NFR','09','1970','836 Doyle Port','male','1','Massachusetts','US'
ata is inserted to table WorkerRace : 'NFR_Script','test/data/team_created/patient_with_cancer_obs_JSON/1_patient2_patientResource.json','494743a2-fea5-4827-8f03-c2b91e4a4c9e','
FR','2106-3'
oot@23bf635d6906:/# python3 FHIR_insertDB.py test/data/team_created/patient_with_cancer_obs_JSON/2_Patient2_ObservationResource.json
est/data/team_created/patient_with_cancer_obs_JSON/2_Patient2_ObservationResource.json: validated, Observation: 8ee79e98-1591-4f62-876c-f842f875f178 created
ata is updated to table Worker : DiagnosedWithCancer='1',LastObservedyear='2018',LastObservedDay='16',LastObservedMonth='04' on Worker with Id: 494743a2-fea5-4827-8f03-c2b91e4a4
9e
oot@23bf635d6906:/# 
```

To run the app, follow the deployment steps for building and running the docker container, then from the prompt execute the following:

1) Run the script on an input file (example below)
   `python3 FHIR_insertDB.py test/data/team_created/patient.json`
2) (Optional) To run our testbench (note: clears database to validate correctness)
   `test/test.sh`
3) (Optional) To connect with Tableau, launch Tableau, open ./demo.twb and fill out the server connection as shown in the below figure. The password is Password!123 (note: make sure data is inserted into database; test.sh clears data):



Microsoft SQL Server
localhost,80

Server: localhost,1433

Database: DFSE_FRB_WORKER

Enter information to sign in to the database:

○ Use Windows Authentication (preferred)

● Use a specific username and password

Username: sa

Password: •••••••••••••

□ Require SSL
□ Read uncommitted data

The SQL server has a username of ‘sa’ and a password of ‘Password!123’.

Submission to External Mentor
TODO: Emailing to our CDC mentors Jill and Breanna.